

[CLAIMS]

1-5. (CANCELED).

6. (CURRENTLY AMENDED) A method of operating a drive motor driving both a tractor, via a tractor drive, and a trailer, via a traveling power takeoff shaft, the traveling power takeoff shaft having at least three discrete, shiftable power takeoff gear stages and the traveling power takeoff shaft being connected to the drive motor, the method comprising the steps of:

defining and providing to an electronic system for controlling the drive motor and the the power takeoff gear stages higher and lower motor rotational speed threshold values for the drive motor;

determining by a speed sensor one of a wheel speed and a vehicle speed; and

by operation of the electronic control and responsive to the one of a wheel speed and a vehicle speed,

controllingly conforming a rotational speed of the traveling power takeoff shaft to a ratio of at least one of the determined vehicle speed and the determined wheel speed so that the tractor and the trailer travel at substantially a same speed;

comparing the determined one of the wheel speed and the vehicle speed to the defined higher and lower motor rotational speed threshold values; and

shifting a power takeoff stage to one of a corresponding next higher and the next lower discrete shiftable power takeoff stage, upon attainment of one of the higher and the lower motor rotational speed threshold value, so as to maintain an optimal traveling speed for both the tractor and the trailer so that both the tractor and the trailer travel together substantially as an integrated unit at substantially the same speed.

7. (CURRENTLY AMENDED) The method according to claim 6, further comprising the step performed by the electronic control of compensating for a difference, when starting from a zero speed, between a speed of rotation at said zero speed and the lower threshold speed of rotation of the motor, by utilizing a greater clutch-slipage of the traveling power take-off shaft.

8. (CURRENTLY AMENDED) The method according to claim 6, further comprising the step performed by the electronic control of achieving, in a case of self-driven trailers, with a knowledge of slip, by an evaluation by [[an]] the electronic system, an optimal speed of rotation ratio between the tractor and the trailer.

9. (CURRENTLY AMENDED) The method according to claim 6, further comprising the step performed by the electronic control of adjusting the ratio of the vehicle speed to the traveling power take-off shaft speed of rotation to a current demand by manual intervention during travel. ←

10. (CURRENTLY AMENDED) A method of operating a traveling power takeoff shaft connected by a clutch to a drive motor for driving a trailer and the drive motor also driving the tractor, the method comprising the steps of:

providing at least three discrete, shiftable power takeoff gear stages;
sensing a wheel rotational speed with a sensor;
defining and providing to an electronic system for controlling the drive motor and the the power takeoff gear stages a lower motor rotational speed threshold value to correspond to a next lower power takeoff stage of the least three discrete, shiftable power takeoff stages; and ←
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by operation of the electronic control and responsive to the wheel rotational speed, ←

comparing the wheel rotational speed to the lower motor rotational speed threshold value;

shifting to the next lower power takeoff stage when the rotational speed of the drive motor achieves the lower motor rotational speed threshold value; and

maintaining an optimal travel speed for both the tractor and the trailer, by shifting to a desired one of the least three discrete shiftable power takeoff stages, so that both the tractor and the trailer travel together with one another substantially as an integrated unit and at a substantially identical speed.

11. (CURRENTLY AMENDED) The method according to claim 10 further comprising the step performed by the electronic control of compensating for a difference in the drive motor rotation speed between a zero rotation speed and the lower motor rotation speed threshold value when, starting from the zero rotation speed, by allowing clutch slippage of the traveling power take off shaft. ←

12. (CURRENTLY AMENDED) The method according to claim 10 further comprising the step performed by the electronic control of utilizing clutch slip and [[an]] the electronic system to optimize a speed of rotation ratio between the tractor and the trailer, in a case of self-driven trailers. ←

13. (CURRENTLY AMENDED) The method according to claim 10, further comprising the step performed by the electronic control of adjusting a ratio of the vehicle speed to the rotation of the traveling power take-off shaft to current demand by manual intervention during travel. ←

14. (CURRENTLY AMENDED) A method of operating a traveling power takeoff shaft that is connected to a drive motor and the traveling power takeoff shaft having at least three discrete, shiftable power takeoff shaft gear stages and the drive motor also driving rear wheels of a tractor, the method comprising the steps of:

monitoring at least one of a vehicle travel speed and a rear wheel rotational speed with a sensor; and

by operation of the electronic control and responsive to the at least one of a vehicle travel speed and a rear wheel rotational speed, ← ←

adapting a rotational speed of the power takeoff shaft to conform to one of the vehicle travel speed and the rear wheel rotational speed, so that a towed trailer travels at substantially a same speed as a speed of the vehicle, by one of:

electronically shifting the traveling power takeoff shaft to a next higher takeoff shaft gear stage of the least three discrete, shiftable power takeoff stages, if a rotational speed of the drive motor essentially equals an upper rotational speed threshold;

electronically shifting the traveling power takeoff shaft to a next lower takeoff shaft gear stage of the least three discrete, shiftable power takeoff stages, if the rotational speed of the drive motor essentially equals a lower rotational speed threshold; and

adapting slip engagement of the clutch of the power takeoff shaft to match a difference between the rotational speed of the power takeoff shaft at a vehicle travel speed of zero and the lower rotational speed threshold of the drive motor to a predefined ratio.

15. (CURRENTLY AMENDED) The method according to claim 6, further comprising the step performed by the electronic control of defining the at least three discrete shiftable power takeoff stages to comprise a low stage, an intermediate stage and a high stage. ←

16. (CURRENTLY AMENDED) The method according to claim 15, further comprising the step performed by the electronic control of defining the low stage as approximately 540 RPM, the intermediate stage as approximately 750 RPM and the high stage as approximately 1000 RPM. ←

17. (CURRENTLY AMENDED) The method according to claim 10, further comprising the step performed by the electronic control of defining the at least three discrete shiftable power takeoff stages to comprise a low stage, an intermediate stage and a high stage. ←

18. (CURRENTLY AMENDED) The method according to claim 17, further comprising the step performed by the electronic control of defining the low stage as approximately 540 RPM, the intermediate stage as approximately 750 RPM and the high stage as approximately 1000 RPM. ←

19. (PREVIOUSLY PRESENTED) The method according to claim 14, wherein the at least three discrete shiftable power takeoff stages comprise a low stage, an intermediate stage and a high stage.

20. (PREVIOUSLY PRESENTED) The method according to claim 19, further comprising the step of defining the low stage as approximately 540 RPM, the intermediate stage as approximately 750 RPM and the high stage as approximately 1000 RPM.

21. (PREVIOUSLY PRESENTED) The method according to claim 20, further comprising the step of defining a ratio of power take-off rotational speed to wheels rotational speed as approximately 40 to 1.

22. (CURRENTLY AMENDED) The method according to claim 20, further comprising the step performed by the electronic control of operating the power take off shaft at vehicle speeds of between 2.5 to 10 km/h. ←

23. (CURRENTLY AMENDED) The method according to claim 20, further comprising the step performed by the electronic control of obtaining different ratios between rotational speeds of the wheels and the traveling power take-off shaft. ←

24. (CURRENTLY AMENDED) The method according to claim 6, further comprising the step of connecting the traveling power takeoff shaft to the drive motor via a clutch, and

by operation of the electronic control adjusting slip of the clutch to optimize the ratio of the rotational speed of the traveling power takeoff shaft to at least one of the determined vehicle speed and the determined wheel speed. ←

25. (NEW) A method of operating a traveling power takeoff shaft that is connected to a drive motor and the traveling power takeoff shaft having at least three discrete, shiftable power takeoff shaft gear stages, including a low stage, an intermediate stage and a high stage, and the drive motor also driving rear wheels of a tractor, the method comprising the steps of:

monitoring at least one of a vehicle travel speed and a rear wheel rotational speed with a sensor; and

by operation of the electronic control and responsive to the at least one of a vehicle travel speed and a rear wheel rotational speed,

adapting a rotational speed of the power takeoff shaft to conform to one of the vehicle travel speed and the rear wheel rotational speed, so that a towed trailer travels at substantially a same speed as a speed of the vehicle, by one of:

electronically shifting the traveling power takeoff shaft to a next higher takeoff shaft gear stage of the least three discrete, shiftable power takeoff stages, if a rotational speed of the drive motor essentially equals an upper rotational speed threshold;

electronically shifting the traveling power takeoff shaft to a next lower takeoff shaft gear stage of the least three discrete, shiftable power takeoff stages, if the rotational speed of the drive motor essentially equals a lower rotational speed threshold;

adapting slip engagement of the clutch of the power takeoff shaft to match a difference between the rotational speed of the power takeoff shaft at a vehicle travel speed of zero and the lower rotational speed threshold of the drive motor to a predefined ratio; and,

compensating for a difference in the drive motor rotation speed between a zero rotation speed and the lower motor rotation speed threshold value when, starting from the zero rotation speed, by allowing clutch slippage of the traveling power take off shaft.